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## Solar modulation of galactic cosmic rays-recent updates

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The cosmic rays stream reaching Earth is of extragalactic origin, some come from the center of our Galaxy, while the source of cosmic rays of the lowest energies is Sun. A common way to register galactic cosmic ray (GCR) and its variability are measurements made by a global network of ground neutron monitors (NMs), operating continuously since 1951. They measure secondary cosmic rays: the nucleonic component of the atmospheric cascade initiated by primary cosmic rays. NMs show fluctuations in the original cosmic ray intensity. These variations occur as a result of a solar changeability and reflect the level of solar activity. The basic periodicity observed by neutron monitors is the 11-year cycle, which is a reflection of the Schwabe cycle, characterized by consecutive periods of amplified solar activity of about 11 years. There is a high anti-correlation between the number of sunspots that perfectly illustrate the level of solar activity and the GCR changeability. The next cycle is the 22-year Hale cycle, related to the reversal of the Sun's magnetic field polarity. There are observed also shorter periodicities: connected to solar rotation, as well as transients appearing in solar behavior. There will be discussed recent updates of long-, mid- and short-term modulation of GCR, based on the neutron monitors observations, as well as mathematical modeling of GCR transport.

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